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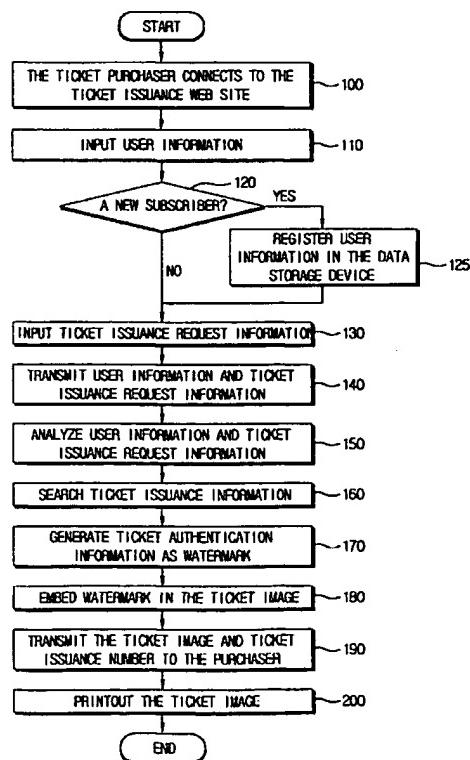
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*[Continued on next page]*

(54) Title: SYSTEM AND METHOD FOR ISSUING AND AUTHENTICATING TICKET USING WATERMARKING TECHNIQUE



(57) Abstract: System and method for issuing and authenticating ticket through a communications network are disclosed. In response to information requesting a ticket issuance transmitted from a buyer for a ticket, a ticket authentication information to authenticate a ticket is generated as a watermark and the generated watermark is embedded in a ticket image. The ticket image embedded with the watermark is transmitted to the buyer who requested the ticket issuance. Ticket scan means installed in a ticket office scans the ticket of said buyer, generates an image of the ticket and extracts a watermark from the generated ticket image. Then, ticket authentication server detects ticket authentication information from the extracted watermark image, comparing the ticket authentication information with the information for the ticket issuance, and finally authenticates the ticket.

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## System and Method for Issuing and Authenticating Ticket Using Watermarking Technique

### Field of the Invention

5       The present invention concerns a system and method for issuing and authenticating ticket through a communications network. More particularly, the present invention relates to a system and method with regard to the various tickets issued by the communications network, information to authenticate the relevant ticket is embedded as watermark in order to determine whether the ticket is authentic or counterfeit so that after  
10      downloading the ticket via on-line from the communication networks immediately or receiving the ticket by electronic mail, it is possible to print out and to use directly at the relevant place where the ticket is used.

### Description of the Related Art

15      The rapid growth of internet network and the expansion of various field of services are uprising to the internet user. Among such expanding fields is the service for reserving and purchasing tickets. The examples of such concerned tickets include entrance tickets to various cultural performances and to leisure facilities, tickets for taking transportation such as airplanes, trains, ships, etc., and coupons and gift certificates for

various facilities such as restaurants and department stores, etc. The currently available internet ticketing methods are presented below.

The first method involves a simple reservation service. With said service, the user connects to the ticket reservation site, registers as a member, and receives an assigned user ID. Should the user desire to purchase tickets, after logging on with his

5 ID, the user should make a reservation for the tickets. Then, the user either transfers the settlement amount on deposit in a bank account or charges the amount by credit card.

Afterwards, the user can go to the place where the ticket is used, get verification with his own I.D. and bank slip, or the order number of the order confirmation, and receive the

10 tickets to use them. Or, at the ticket reservation site, the user can download the temporary tickets, print them out by a printer, go to the place where the ticket is used and exchange them with the entrance tickets.

Nevertheless, according to this method, even though the tickets are reserved through communications network, the user can use the tickets only when he himself goes 15 to the place where the ticket is used and gets the tickets issued. In this regard, there is a high potential for troublesome matters of waiting among lots of people for a long time.

Thus, the advantage of a prior reservation for ticket is not substantially provided to the users.

The second method concerns a coupon service, which can be simply used.

After the coupon images of various kinds of free tickets or discount coupons available on the communications network are printed out, this service provides the user to go to each place where the ticket is used and use them.

5 Nevertheless, according to this method, fabrication, alteration and counterfeit of the coupons can be easily done, therefore, the coupons are merely applied to simple purposes such as discount or publicity and do not fully perform their original role as tickets in actual circumstances. That is, a ticket sale service according to this method has a problem, as the place where the ticket is used and its use are exceedingly limited.

10

#### Summary of the Invention

The present invention directs to a system and method for issuing and authenticating ticket which solve the problems aforementioned.

15 The object of the present invention is, after reserving tickets on internet, to receive transmission of the ticket immediately by web browser or electronic mail, print it out by printer and to use the printed out ticket at the place where the ticket is used instantaneously so that the ticket purchaser does not have to experience inconvenience of waiting for a long time in the crowd.

The other object of the present invention is, by embedding a predetermined watermark on said ticket, to prevent forgery and alteration and to provide a reliable ticket sale service through network.

In order to achieve the aforementioned object, the present invention provides a ticket issuing method through communications network wherein the ticket is embedded with ticket authentication information as watermark comprising steps of (a) transmitting ticket issuance request information inputted by ticket purchaser to a ticket issuance server through communications network; (b) generating ticket authentication information for authenticating the ticket as watermark in response to the ticket issuance request of the ticket purchaser; (c) embedding the watermark into ticket image; (d) transmitting the ticket image embedded with the watermark to the ticket purchaser through communications network; and (e) printing by the ticket purchaser the transmitted ticket image.

In order to achieve other object of the present invention, the present invention furnishes in a ticket authentication system comprising data storage means storing user information and ticket issuance information, a ticket identification means recognizing ticket, and ticket authentication server, a method for authenticating ticket issued through communications network and embedded with ticket authentication information as watermark image, the method comprising steps of (a) transmitting ticket image generated

after identifying the ticket via the ticket identification means to the ticket authentication server; (b) extracting the watermark image from the ticket image; (c) detecting the ticket authentication information from the extracted watermark image; and (d) authenticating the ticket by comparing the ticket authentication information with the ticket issuance information stored in the data storage means.

#### Brief Description of the Drawings

Fig. 1 is a block diagram illustrating the constitution of the ticket issuance and authentication system according to the present invention.

Fig. 2 is a flow chart explaining the ticket issuance process according to the present invention.

Fig. 3 is a drawing illustrating an example of user information inputted by ticket purchaser.

Fig. 4 (a) is a drawing illustrating ticket issuance information and Fig. 4 (b) is a drawing illustrating ticket authentication information, respectively.

Fig. 5 is a flow chart explaining the ticket authentication process according to the present invention.

Detailed Description of the Preferred Embodiments

Herein below, in reference to the attached drawings, the preferred embodiments of the present invention are explained in detail.

5 Fig. 1 is a block diagram illustrating the constitution of the ticket issuance and authentication system according to the present invention.

The ticket issuance and authentication system according to the present invention comprises a ticket issuance request device 10, a ticket printout device 20, ticket identification device 30, ticket issuance server 40, ticket authentication server 50, and  
10 data storage device 60.

A person wishing to purchase a ticket (or to purchase in advance) inputs information to ticket issuance through a ticket issuance request device 10. The inputted information is transmitted to a ticket issuance server 40 through communications network, and the ticket issuance server 40 generates watermarking image inclusive of information  
15 for authenticating ticket and embeds said watermarking image to a ticket image. The ticket printout device 20 receives the transmitted ticket image embedded with watermark from the ticket issuance server 40 through communications network and print it out.

When the user who purchased ticket brings the printed out ticket to the place

where the ticket is used, the ticket identification device 30 installed at the place where the ticket is used identifies the printed out ticket and generates ticket image or receives input of ticket issuance number from the user and transmits it together with identified ticket image to the ticket authentication server 50. The ticket authentication server 50 extracts 5 watermarking image for ticket authentication from the identified ticket image and authenticates the ticket. The data storage device 60 stores user information and ticket issuance information.

The present invention is divided into two processes, which are a process issuing ticket and a process authenticating the issued ticket at the place where the ticket is used.

10 First , the ticket issuance process according to the present invention is explained below.

Fig. 2 is a flow chart explaining the ticket issuance process according to the present invention.

As the ticket purchaser connects to the ticket issuance web site (Step 100) and logs in, the ticket issuance process is initiated. However, the ticket issuance process of 15 the present invention is not limited to the method connecting to the internet site through web browser, but besides such method, it is possible to use ordinary telephone, to connect thereto through Automatic Response System (ARS). Moreover, by connecting thereto through Personal Digital Assistant (PDA) or mobile phone, the ticket issuance can

be requested, and the downloaded ticket image can be received.

Next, the ticket purchaser inputs as user information his personal history information and payment method. (Step 110)

Fig. 3 is a drawing illustrating an example of user information inputted by the ticket purchaser. If the purchase uses the ticket purchase service of the present invention for the first time (Step 120), he/she must input all user information as exemplified in Fig. 3 in order to register as a member of a ticket issuance site.

Such user information is registered in the data storage device 60 (step 125), thus the member registration is achieved. With regard to the existing service users, only 10 user ID and password allow them to connect as the user information is already inputted in the data storage device 60 at the time of the previous purchase.

Next, the ticket purchaser inputs ticket issuance request information (Step 130). The content of the ticket issuance request information is determined according to the characteristics of the ticket. For example, in order to get movie ticket issued, name of 15 the movie, name of the theater, date and time, and seat number, etc. may be included, and for airplane ticket, a place of departure, a place of destination, date and time of the departure and arrival of the airplane, seat number, etc. may be included. The ticket issuance request device 10 receives input of ticket issuance request information and

transmits to ticket issuance server 40 together with user information (in case of a newly registered client) through communications network (for example, internet) (Step 140).

Subsequently, the inputted user information and ticket issuance request information are analyzed by the ticket purchaser (Step 150), and ticket issuance process at the ticket issuance server 40 is continued.

Successively, with regard to ticket requested by the ticket purchaser, the ticket issuance information stored in the data storage device 60 is searched and read (Step 160).

In the ticket issuance information, in addition to ticket issuance request information inputted by the ticket purchaser, ticket issuance number and ticket issuance agency are added. Fig. 4 (a) is a drawing explaining as an example, a ticket issuance information, and exemplifies a case of a movie ticket. In reference to Fig. 4 (a), name of the theater (name of the ticket issuance agency), name of the movie, date, time, seat number and ticket issuance number, etc. comes within the purview of the ticket issuance information.

Next, the ticket issuance server 40 generates ticket authentication information for authenticating ticket among ticket issuance information and user information as watermark (Step 170), and embeds it in the ticket image (Step 180). So called 'ticket

'image' means the entire ticket inclusive of a predetermined image and text, etc. and said watermark can be embedded in the arbitrary portion of the entire ticket.

Fig. 4 (b) is a drawing explaining as an example, ticket authentication information.

In reference to Fig. 4 (b), the ticket authentication information includes name of the  
5 purchaser, ticket issuance number, ticket issuance agency and identifier of the organization for embedding the watermark, etc.

To describe ticket (that is, the ticket image) in more detail, for example, a predetermined image such as a movie poster, text such as date and seat information, etc. are the information that can be identified by the naked eye from the ticket image and  
10 displayed. Meanwhile, the ticket authentication information such as name of said purchaser, ticket issuance number and identifier of the watermark embedding organization, etc. are watermark unidentifiable by the naked eye, and it is embedded in the arbitrary position of said visible predetermined image and text, etc.

As described in the above, the ticket authentication information is embedded in  
15 the ticket not to be identified by the naked eye. During such process, in the ticket issuance server, a watermarking method is used. For the watermarking method of the present invention, for instance, a method of an invention suggested in the patent applications of the present applicant related to watermarking may be used. For example,

such patent applications are PCT Application No. PCT/US99/20649 entitled "Watermarking of Digital Image Using Wavelet Transform and Discrete Cosine Transforms" and U.S. Patent Application No. 09/684,961 entitled "Method and Apparatus for Embedding Text Watermarking", and they are all assigned to the applicant of the 5 present invention.

Other than that, various watermark embedding methods which can be identified by image device (for instance, scanner) can be used. Thus, the watermark used in the present invention may employ a method generating a series of random signals from key and using them as watermark (hereinafter, refer to as "key method"), a method using 10 user's logo, etc. as watermark (hereinafter, refer to as "logo method"), or a method simultaneously using both of said key method and logo method.

Moreover, a constitution that may embed robust watermark and fragile watermark, or simultaneously embed both said robust watermark and fragile watermark is feasible. So called 'robust watermark' refers to a watermark surviving against any 15 external attack or change without any change made thereto or disappearance thereof.

In other words, the robust watermark is a watermark that preserves information regarding user authentication although external attacks such as downscale, magnification, rotation and compression, etc. are made to the embedded watermark bearing information. So

called 'fragile watermark' refers to the watermark that can clearly identify whether there has been any manipulation made externally by alteration and counterfeit by letting a loss made to watermark at the slightest external fabrication or change.

Besides, an application of optical watermarking, etc. such as using optical interference or latent image , etc. is additionally possible. For reference, the optical interference refers to a phenomenon that makes the pattern shape visible by interference wherein the pattern shape is not visually very discernible depending on gap and color thereof as the dark portion of the refractive wave instituted in the pattern shape is folded and is photocopied as its form is shaped when the light sheds from one side to the other evenly and is pushed forward at the time of scanning or photocopying.

The latent image refers to a method and the phenomenon for forgery prevention thereof for detecting the contents through physical and chemical means by hiding the pattern shape or figure, and characters etc. as particular characters or designs become visible when they appear from the use of a scanner or a photocopier as solid line or security thread is inserted during the process of pasting two sheets of paper into a sheet or chemical is used in the ordinary paper so that it is difficult to detect by the naked eye at ordinary times.

Accordingly, when printing the ticket out and should there be an illegal act of

photocopying the ticket and distributing thereof, the ticket photocopied from the photocopier will show pattern shape or phrase (for example, such as "COPY") that was invisible to the naked eye which tells that it is a duplicated copy. Thus, the illegal photocopying of the ticket can be prevented.

5        In order to reduce the amount of operation when embedding and extracting watermark, it is desirable to make the watermark image small within the limit inclusive of information to be embedded. If the watermark image is smaller than the size of the entire image of the ticket, and the watermark embedding process is performed within the range of the established watermark range of the ticket image, and when extracting, the  
10      watermark is also extracted within said watermark range, the amount of operation required for embedment and extraction can be reduced correspondingly to the area of the watermark range. According to the preferred embodiment of the present invention, the area of the watermark range should be determined within the range the information included as the watermark is well distinguished by the naked eye after extraction.

15      The ticket image including the watermark image is transmitted to the purchase together with ticket issuance number. (Step 190) The ticket issuance number is not included in said ticket image, but either it is notified to said purchaser to write down from the web site, etc. or it can be included in the ticket image as watermark. Said ticket

transmission through communications network can be forwarded to the purchaser by electronic mail or displayed directly on the purchaser's computer screen through web browser.

The purchaser prints out from the printer the ticket image transmitted from the ticket issuance server 40. (Step 200). At this time, it is recommended that the resolution of the printer should be 300dpi or more. Such resolution is required as a certain level or more of the resolution is obligatory in order to properly and accurately extract the watermark when extracting the watermark information embedded therein for authentication as the original ticket at the place where the ticket is used. Currently, the ordinarily used printer has generally 300dpi or more resolution, therefore, it is not particularly required to have high resolution.

Next, the ticket authentication process according to the present invention is defined. Fig. 5 is a flow chart explaining the ticket authentication process according to the present invention.

The ticket purchaser uses the ticket printed out from the printer directly to the place where the ticket is used. The ticket authentication process is initiated by the ticket purchaser inserting the ticket to the ticket identification device at the place where the ticket is used. (Step 210). As a ticket identification device, for example, Optical

Character Reader (OCR) can be used. Moreover, as aforementioned, the method for inserting ticket to authenticate is more advantageous than that for extracting of the watermark, yet the identification of the ticket can be surely done by bringing the ticket to said identification device.

5       The ticket identification device 30 determines whether the ticket is intact (matters such as crumpled or torn tickets) (Step 220). If the ticket is intact, the authentication process continues to the next step, however, if not, the ticket is discharged out of the device (Step 225).

Continuously, the purchaser inputs manually the ticket issuance number by using  
10      key pad attached to the ticket identification device 30 (Step 230). Such input will enable a secondary authentication in addition to the authentication solely by the watermark embedded in the ticket. However, should the ticket issuance number is embedded as watermark in the ticket image during the ticket issuance process, an authentication without manual input process of such ticket issuance number is possible.

15       The ticket identification device 30 scans the ticket embedded with the watermark and generates the ticket image (Step 240). The generated ticket image and the ticket issuance number inputted by the purchaser in the ticket identification device 30 are transmitted to the ticket authentication server 50 (Step 250). The ticket authentication

server 50 operates the watermark detection system and extracts watermark image from the ticket image transmitted from the ticket identification device 30 (Step 260).

- The module extracting watermark undergoes two steps. The first step involves a process detecting the watermark edge which is a step detecting the predetermined watermark range wherein the water mark data are hidden among the entire range of the ticket so that analog data are transformed to digital data.
- 5 watermark range wherein the water mark data are hidden among the entire range of the ticket so that analog data are transformed to digital data.

Various methods can be used for a method for separating range embedded with watermark. A method that embeds a special identifier also as watermark at the beginning and the end of the watermark range when embedding watermark can be used.

- 10 If the watermark range is separated by such method, an accurate separation of the range is possible.

Furthermore, when the identifier indicating the watermark range is not embedded, a method for detecting the ticket edge by a general image edge detection method, and separating the watermark range at the relative position from the edge is also can be used.

- 15 After separating the watermark range as such, the second step is to amplify the transformed data followed by the extraction of the watermark image from the image data.

Next, the ticket authentication information is detected from the extracted watermark image (Step 270). Subsequently, by using ticket issuance number inputted

by the user, the ticket issuance information and user information are searched from the data storage device 60 (Step 280).

Whether the detected ticket authentication information accords the ticket issuance information stored in the data storage device 60 and ticket issuance number is confirmed and the authenticity of ticket is authenticated (Step 290). As a result of authentication, entrance permission or result of disapproval is transmitted (Step 300) to the ticket identification device and the ticket identification device 30 prints out the authentication result (Step 310).

Meanwhile, said ticket authentication process (Step 260 to Step 290) does not necessarily have to be separately achieved from the ticket authentication server 50. In addition to ticket identification and printout of the result after the authentication within the ticket identification device 30, the authentication process (Step 260 to 290) of said ticket is all achieved, and an embodiment wherein the data storage device 60 is connected to the ticket identification device 30 and is operated is also undoubtedly possible.

In order to implement the present invention, the ticket optical scan device connected to the ticket authentication server should be furnished to each of the place where the ticket is used. This device fundamentally plays a role of scanning the inserted ticket and reading the data therefrom. This device has a role of confirming the ticket by

being operated with the server. Thus, the device is deemed to take a role of self ticket remover.

### Industrial Applicability

5 Ticket issuance through communications network according to the present invention can eliminate the inconvenience of securing tickets one by one by visiting the ticket issuance locations, and render an effect of escaping trouble of receiving ticket by actually going oneself even though the ticket has been reserved through internet.

Accordingly, the present invention reduces the customers' waiting period for  
10 issuance of ticket by standing in a line at each of the place where the ticket is used, and removes confusion of a large crowd in a limited place, so that more pleasant service is furnished to the customers.

Moreover, the ticket issuing agency can enjoy an effect of reducing loss of human or material resources to a provision of ticket sale service.

15 Furthermore, unlike bar code that can be easily photocopied and manipulated, the watermarking system used in the present invention enables prevention of duplication since the watermark information embedded in the ticket cannot be identified by the user's naked eye.

Also, the photocopying or forgery by scanner of the printed out ticket can be prevented by additionally applying an optical watermarking etc. employing phenomenon such as optical interference or latent image. Of course, among the kinds of ticket aforementioned, in a case of disposable ticket, once checked at the ticket disposal and

5 subsequently the same ticket is disposed again, said ticket is made impossible to use to prevent re-use, and in case of a kind of ticket such as coupons or gift certificates, etc., photocopying of said tickets etc. is made to be prevented.

What is claimed is:

1. A method for issuing ticket embedded with ticket authentication information as

watermark through a communications network, the method comprising steps of:

(a) transmitting ticket issuance request information inputted by ticket purchaser to a

5 ticket issuance server through communications network;

(b) generating ticket authentication information for authenticating said ticket as

watermark in response to the ticket issuance request of said ticket purchaser;

(c) embedding said watermark into ticket image;

(d) transmitting said ticket image embedded with said watermark to the ticket

10 purchaser through communications network; and

(e) printing said transmitted ticket image by said ticket purchaser.

2. A method for issuing ticket embedded with ticket authentication information as

watermark through a communications network, the method comprising steps of:

(a') transmitting ticket issuance request information and user information inputted by

15 ticket purchaser to a ticket issuance server through communications network;

(b') generating ticket authentication information for authenticating said ticket as

watermark in response to the ticket issuance request of said ticket purchaser in

accordance with said user information and ticket issuance information;

(c') embedding said watermark into ticket image;

(d') transmitting said ticket image embedded with said watermark to said ticket purchaser through communications network; and

(e') printing said transmitted ticket image by said ticket purchaser.

5 3. The method according to Claim 2, wherein said user information includes at least one of purchaser name, purchaser ID and purchaser password.

4. The method according to Claim 1 or Claim 2, wherein said step (d) or step (d') comprises a step of transmitting a predetermined ticket issuance number to said ticket purchaser.

10 5. The method according to Claim 1 or Claim 2, wherein the size of said watermark is smaller than that of said ticket image; and said step (c) or step (c') embeds said watermark into a predetermined watermark region among said ticket images.

6. The method according to Claim 1 or Claim 2, wherein said ticket authentication information includes at least one of ticket purchaser information, ticket issuance number, ticket issuing agency and watermark embedding organization.

15 7. The method according to Claim 1 or Claim 2, wherein said embedding said watermark employs a digital image watermarking method using wavelet transform and discrete cosine transform, or a text watermarking method or both of these methods.

8. The method according to Claim 7, wherein said watermark is generated by a key

generating method or a logo method or a method simultaneously employing both  
methods.

9. The method according to Claim 1 or Claim 2, wherein said embedding said watermark

5 embeds a robust watermark or a fragile watermark, or simultaneously both  
watermarks.

10. The method according to Claim 1 or Claim 2, wherein said embedding said watermark

by using a optical interference or a latent image, thereby enables identification of

illegal photocopying of the ticket at the time the issued ticket has been illegally

10 photocopied.

11. In a ticket authentication system comprising data storage means for storing user

information and ticket issuance information, a ticket identification means for

recognizing the ticket, and ticket authentication server, a method for authenticating

the ticket issued through communications network and embedded with ticket

15 authentication information as watermark, the method comprising steps of:

(a) generating a ticket image by identifying said ticket via said ticket identification  
means and transmitting the ticket image to said ticket authentication server;

(b) extracting said watermark from said ticket image;

(c) detecting said ticket authentication information from said extracted watermark; and  
(d) authenticating ticket by comparing said ticket authentication information with said  
ticket issuance information stored in said data storage means.

12. In a ticket authentication system comprising data storage means storing user

5 information and ticket issuance information, a method for authenticating ticket issued  
through communications network and embedded with ticket authentication information  
as watermark, the method comprising steps of:

(a) generating ticket image by identifying said ticket;

(b) extracting said watermark from said ticket image;

10 (c) detecting said ticket authentication information from said extracted watermark; and

(d) authenticating ticket by comparing said ticket authentication information with said  
ticket issuance information stored in said data storage means.

13. The method according to Claim 11 or Claim 12, further comprising after said step (a)

and prior to said step (b) a step of:

15 (a1) inputting ticket issuance number by ticket purchaser.

14. The method according to Claim 11 or Claim 13, further comprising after said step (d)

steps of,:  
(e) transmitting the authentication result regarding said ticket from said ticket

authentication server to said ticket identification means; and

(f) outputting said transmitted ticket authentication result from said ticket identification means.

15. The method according to Claim 11 or Claim 12, wherein said step (b) comprising

5 steps of:

detecting a predetermined watermark region embedded with said watermark, and

extracting said watermark image from said detected predetermined watermark region.

16. A system for issuing ticket embedded with ticket authentication information as

watermark through communications network, the system comprising:

10 a ticket issuance request means requesting the issuance of ticket by ticket purchaser's inputting ticket issuance request information and user information;

a data storage means storing said user information and ticket issuance information for the issuance of ticket; and

15 a ticket issuance server, in response to said ticket issuance request by said ticket purchaser, generating watermark containing ticket authentication information for authenticating ticket in accordance with said user information and said ticket issuance

information, embedding said watermark into ticket image and transmitting thereof to said ticket purchaser.

17. The system according to Claim 16, wherein said ticket issuance request means transmits said user information and said ticket issuance request information on internet through web browser.

18. The system according to Claim 16, wherein said ticket issuance request means  
5 transmits said user information and said ticket issuance request information through cable telephone networks, mobile phone or Personal Digital Assistant (PDA).

19. The system according to Claim 16, wherein said ticket issuance server comprising:

means for analyzing said ticket issuance request information transmitted from said ticket purchaser;

10 means for searching said ticket issuance information from said data storage means;

means for generating ticket authentication information according to said user information and said ticket issuance information as watermark;

means for embedding said generated watermark into ticket image; and

15 means for transmitting said ticket image and ticket issuance number to ticket purchaser.

20. A system for authenticating ticket issued through communications network and embedded with ticket authentication information as watermark image, the system

comprising:

a data storage means storing user information and ticket issuance information;

a ticket identification means generating ticket image after identifying said issued

ticket and transmitting thereof to a ticket authentication server; and

5 a ticket authentication server extracting watermark from said generated ticket  
image, and detecting ticket authentication information from said extracted watermark.

21. The system according to Claim 20, wherein said ticket identification means  
comprising means for inputting the ticket issuance number by said ticket purchaser.

22. The system according to Claim 20 or Claim 21, wherein said ticket authentication

10 server comprising:

means for extracting watermark from said ticket image;

means for detecting ticket authentication information from said extracted  
watermark;

means for authenticating ticket by comparing said detected ticket authentication

15 information with said ticket issuance information stored in said data storage means; and

means for transmitting the authentication result regarding said ticket by said ticket  
identification means.

23. The system according to Claim 20 or Claim 21, wherein said ticket identification

means further comprising:

means for outputting said ticket authentication result transmitted from said ticket authentication server from said ticket identification means.

24. A system for authenticating ticket issued through communications network and

5 embedded with ticket authentication information as watermark image, the system comprising:

a data storage means storing user information and ticket issuance information; and

a ticket identification and authentication device generating ticket image after identifying said issued ticket, extracting watermark from said generated ticket image, and

10 detecting ticket authentication information from said extracted watermark.

FIG 1.

1/5

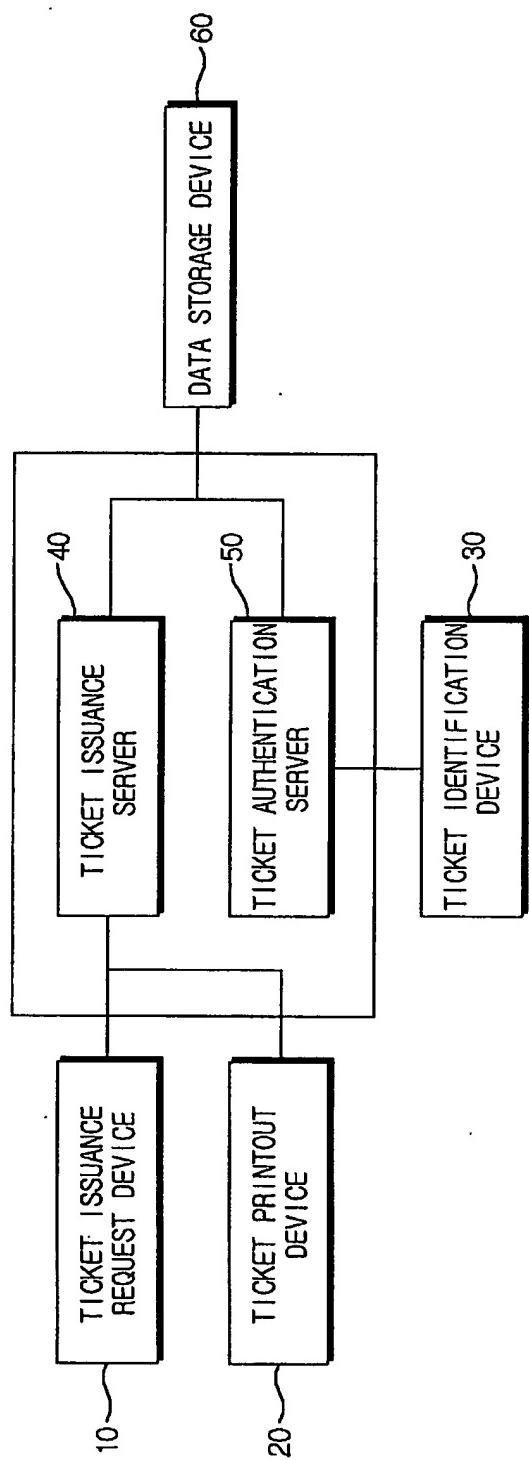


FIG 2.

2/5

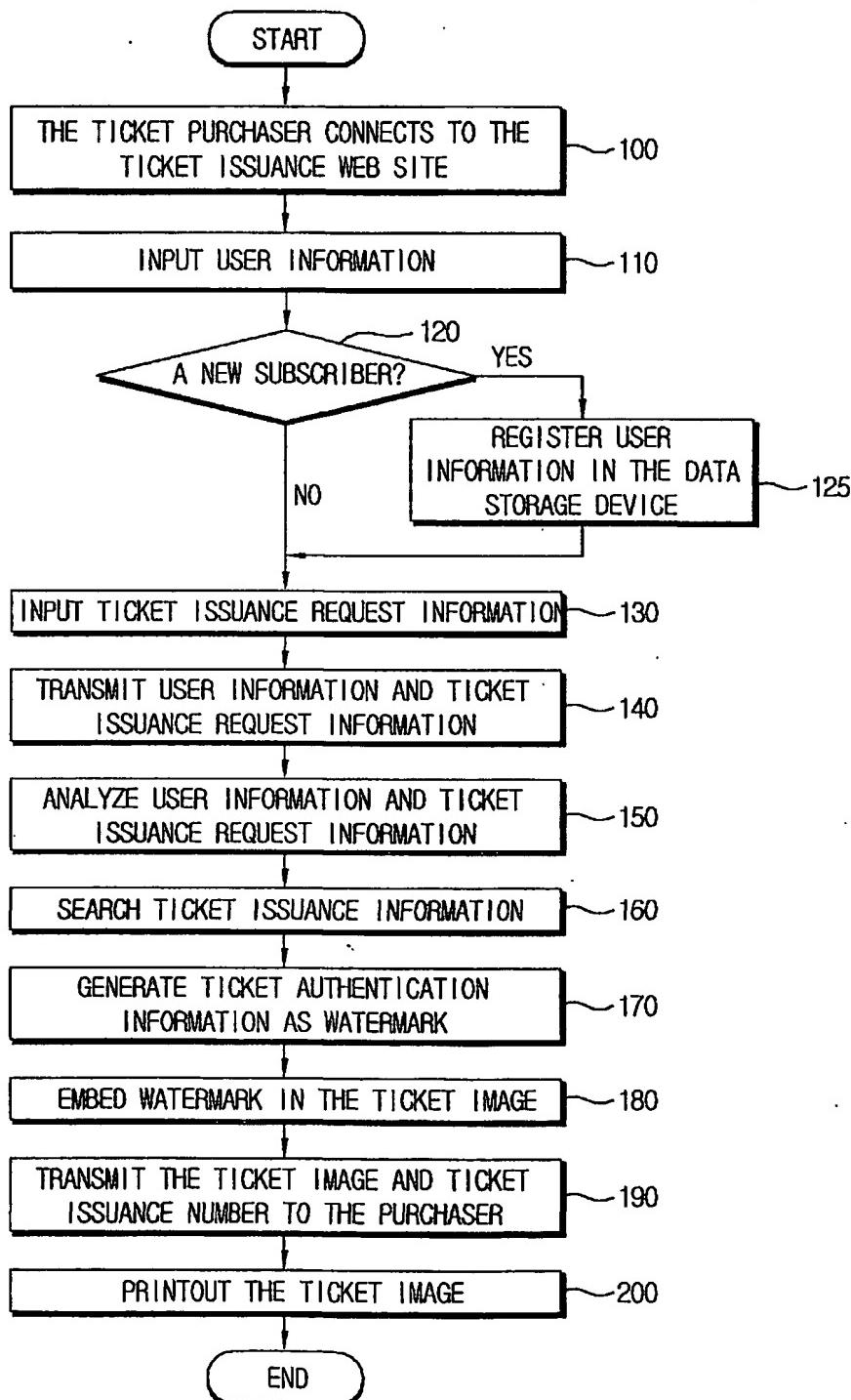


FIG 3.

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## USER INFORMATION

- \* NAME
  - \* ID
  - \* PASSWORD1
  - \* PASSWORD2
- 
- \* IDENTIFICATION NUMBER
  - \* BIRTHDATE
  - \* GENDER
  - \* OCCUPATION
  - \* NAME OF THE SCHOOL OR THE COMPANY
  - \* ADDRESS
  - \* POSTAL CODE
  - \* PHONE NUMBER(HOME/COMPANY)
  - \* FAX
  - \* E-MAIL
  - \* HOME PAGE

## PAYMENT INFORMATION

- \* PAYMENT METHOD
- \* TYPE OF CARD
- \* CARD NUMBER
- \* NAME ON CARD
- \* TERM OF VALIDITY

FIG 4.

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## TICKET ISSUANCE INFORMATION

(a)

OO THEATER TICKET

TITLE OF MOVIE: OOO

DATE: 2000. 6. 10 TIME: 2PM

SEAT NUMBER: 2F234

TICKET ISSUANCE NUMBER: 12123-4556

## TICKET AUTHENTICATION INFORMATION

(b)

KIM HUISUN (PURCHASER NAME)

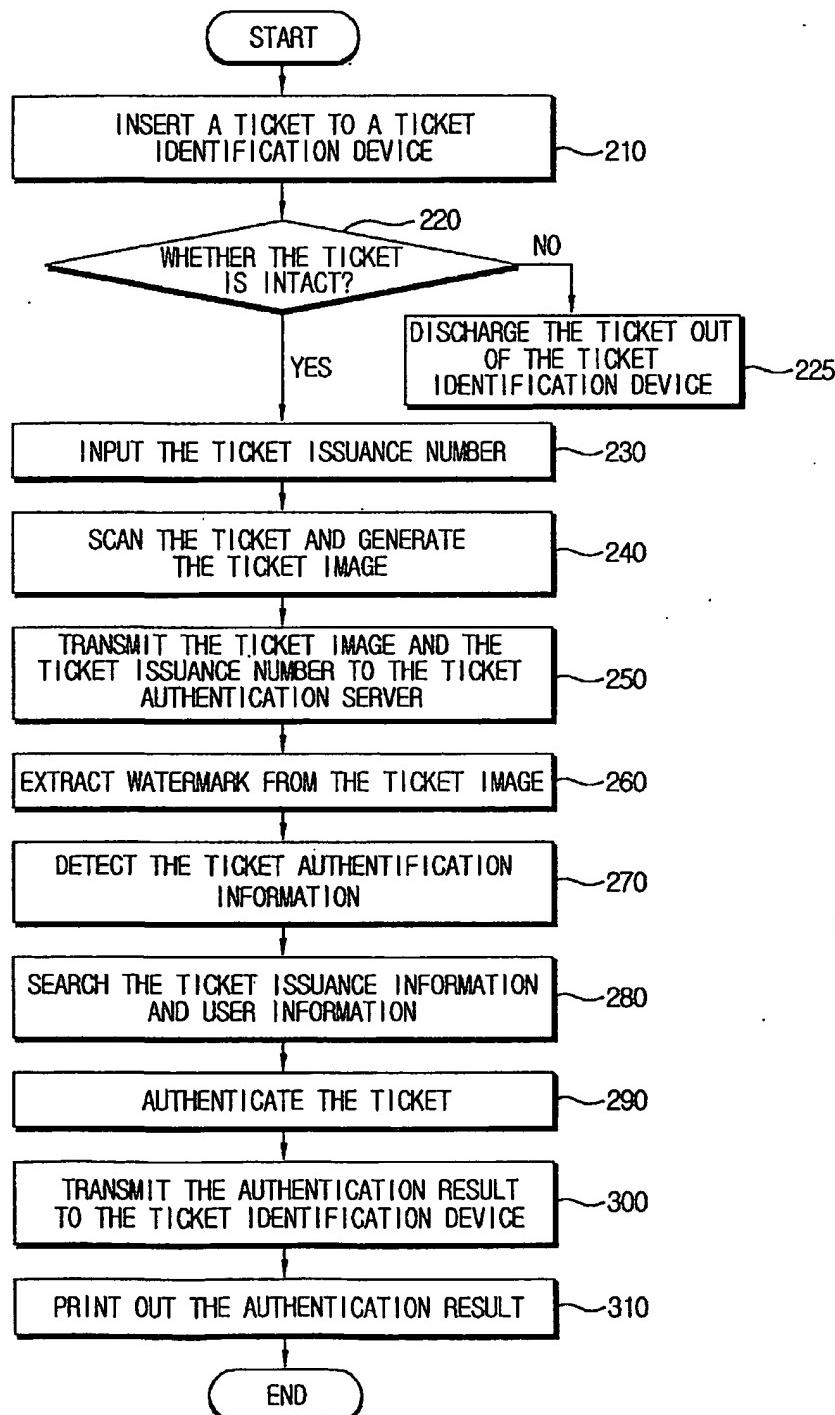
12123-4556 (TICKET ISSUANCE NUMBER)

OO THEATER (TICKET AGENCY)

MARKANY (WATERMARK EMBEDDING  
ORGANIZATION)

FIG 5.

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR01/00998

## A. CLASSIFICATION OF SUBJECT MATTER

**IPC7 G07B 1/00**

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 99-0044818 A (LEE, Han Ho, etc.) 25. JUNE 1999 ( 25. 06. 1999 ), - See the whole document -	1,2,7,9
A	EP 0 952 728 A2 (INTERNATIONAL BUSINESS MACHINES CORPORATION) 27 OCTOBER 1999 ( 27. 10. 1999 ), - See the whole document -	1-24

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	
"A"	document defining the general state of the art which is not considered to be of particular relevance
"E"	earlier application or patent but published on or after the international filing date
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O"	document referring to an oral disclosure, use, exhibition or other means
"P"	document published prior to the international filing date but later than the priority date claimed
"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&"	document member of the same patent family

Date of the actual completion of the international search  07 SEPTEMBER 2001 (07.09.2001)	Date of mailing of the international search report  11 SEPTEMBER 2001 (11.09.2001)
Name and mailing address of the ISA/KR  Korean Intellectual Property Office Government Complex-Daejeon, Dunsan-dong, Seo-gu, Daejeon Metropolitan City 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer  CHOI, Hoon  Telephone No. 82-42-481-5990



**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

PCT/KR01/00998

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR-A- 99-0044818	25. 06. 99	None	
EP-A2- 0 952 728	27. 10. 99	KR-A-99-0082729 jp-A2-2000-08315	25. 11. 99 21. 03. 200